Expanding the Treatment Window Raising the Bar for Patient Safety

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Expanding the Treatment Window Raising the Bar for Patient Safety

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Abstract:

As evidenced-based stroke care continues to evolve more alternatives are available to enable life-saving intervention for acute ischemic stroke patients. This presents new challenges in providing the best plan of care which now extends beyond FDA approved intravenous alteplase to include mechanical interventions that further extends the treatment time. Nurses play a pivotal role in all phases of care and therefore need to gain a deeper understanding in the decision making in the first twenty four hours. This poster will review the current use of imaging to guide and support clinical intervention and clarify differences between treatment time windows for acute ischemic stroke. As important as early treatment, careful oversight of performance criteria ensures safe delivery of care and facilitates achievement of best patient outcomes. Participants will analyze quality metrics to aide in the concurrent and retrospective evaluation of stroke patient care.

Objectives:

- Identify the inclusion/exclusion criteria for use of intravenous alteplase.
- Describe the decision making in extending the window for intravenous alteplase.
- Apply data available from multi modality imaging and advanced endovascular techniques to provide acute stroke rescue.

Summary of Differences from FDA Recommendations

- Warnings: Age > 80
- NIH Stroke Scale > 25
- Previous history of stroke and diabetes
- Any anticoagulant use even if INR < 1.7
- CT findings consistent > 1/3 MCA territory

Major Inclusion and Exclusion Criteria

Main Inclusion criteria
Acute ischemic stroke
Age, 18 to 80 years
Onset of stroke symptoms 3 to 4.5 hours before initiation of study-drug administration
Stroke symptoms present for at least 30 minutes with no significant improvement before treatment
Main exclusion criteria
Intracranial hemorrhage
Time of symptom onset unknown
Symptoms rapidly improving or only minor before start of infusion
Severe stroke as assessed clinically (e.g. NIHSS score >25) or by appropriate imaging techniques*
Seizure at the onset of stroke
Stroke or serious head trauma within the previous 3 months
Combination of previous stroke and diabetes mellitus
Administration of heparin within the 48 hours preceding the onset of stroke, with an activated partial-thromboplastin time at presentation exceeding the upper limit of the normal range
Platelet count of less than 100,000 per cubic millimeter
Systolic pressure greater than 185 mm Hg or diastolic pressure greater than 110 mm Hg or aggressive treatment (intravenous medication) necessary to reduce blood pressure to these limits
Blood glucose less than 50 mg per deciliter or greater than 400 mg per deciliter
Symptoms suggestive or subarachnoid hemorrhage, even if CT scan was normal
Oral anticoagulant treatment
Major surgery or severe trauma within the previous 3 months
Other major disorders associated with an increased risk of bleeding
A severe stroke as assessed by imaging was defined as a stroke involving more than one third of the middle cerebral artery territory. NIHSS denotes National Institutes of Health Stroke Scale in which total scores range from 0 to 42 with higher values reflecting more severe cerebral infarcts.

*Taken from Hacke et al (2008).

Use of Imaging to Guide Clinical Decisions:

Computed Tomography:

Non Contrast CT remains the "gold standard"in acute ischemic stroke.

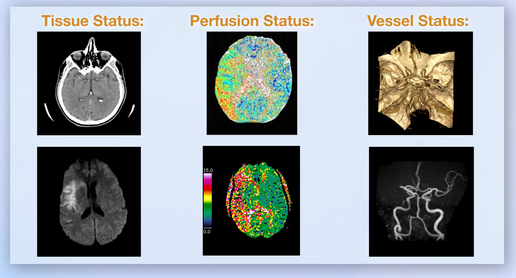
Multi modality CT with CT perfusion/ CT angiography can provide info on cerebral blood volume, blood flow and mean transit time helping to identify ischemic core and penumbra.

Magnetic Resonance Imaging:

Earliest evidence of ischemic injury and evaluates extracranial and intracranial blood vessels. Use of diffusion weighted and perfusion weighted imaging provides further advantages of defining ischemic area and hemodynamic status of cerebral blood flow. Tissue mismatch can be utilized to identify salvageable brain.

Carotid duplex scanning used to screen for cervical internal carotid artery stenosis.

Cerebral arteriography is the best tool to definitively evaluate the cerebral vasculature for stenosis and changes in blood flow dynamics.



Commonly Measured Acute Stroke Metrics:

NINDS Time Targets for Organized Triage of Acute Stroke Patients: Key Evaluation Time Targets for the Potential rtPA Candidate

Maximum Intervals Recommended by NINDS	Time
Door-to-doctor first sees patient	10 min
Door-to-CT completed	25 min
Door-to-CT read	45 min
Door-to-thrombolytic therapy starts	60 min
Physician examination	15 min
Neurosurgical expertise available*	2 h
Admitted to monitored bed	3 h

CT indicates computed tomography
*On-site or by transfer to another facility

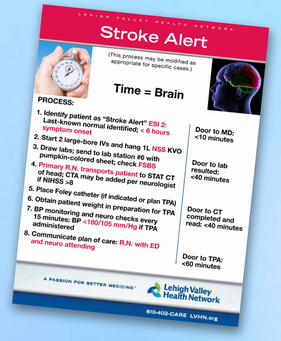
*Taken from Summers et al (2009)

Performance Measures From the Joint Commission Primary Stroke Center Certification Program

Stroke-1	Deep vein thrombosis prophylaxis
Stroke-2	Discharged on antithrombotic therapy
Stroke-3	Patients with atrial fibrillation receiving anticoagulation therapy
Stroke-4	Thrombolytic therapy administered
Stroke-5	Antithrombotic therapy by end of hospital day two
Stroke-6	Discharged on statin medication
Stroke-7	Dysphagia screening
Stroke-8	Stroke education
Stroke-9	Smoking cessation/advice/counseling
Stroke-10	Assessed for rehabilitation

Strategies for Best Practice:

- Develop standard work processes
- Advocate use of checklists
- Annual Staff Training/In-service
- Mock stroke drills
- Time out before drug administration & procedures
- Adhere to guidelines
- Frequent monitoring before, during and after changes
- Focused performance improvement
- Collect and feed forward process and outcome data



Nursing Implications for Practice:

Stroke treatment is rapidly changing. Nurses need to understand cerebrovascular pathophysiology and available options for reperfusion interventions. Advances in neuro imaging will aide in better patient selection for emerging new therapies with goal to open blood vessels faster. Clear communication is essential and includes hand offs, medication reconciliation, nurse to nurse neuro exams and individualized plans of care.

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